areas the following arrangement is given, in which the consecutive positions and velocities of the two are placed in chronological order:

June.

Number	I H	I L	II H	II L	III L	IV L	III H	IV H	V L	VI L	VII L	VIII L	V H
Velocity	21	20	20	21	30	14	18	23	21	24	9	12	14

July.

Number	I L	I H	II L	III L	II H	IV L	V L	III H	VI L	IV H	VII L	V H	VIII L	IX L
Velocity	11	22	13	29	24	20	14	29	42	19	17	16	18	35

There seems to be quite a remarkable uniformity in the gradual rise and fall of these velocities, and this is more surprising when we consider that in some cases the motion is made up for a large number of days while in others for a very few days.

A comparison with storms of previous years is given in the following table:

Year.	Number.	Velocity per hour.	Year.	Number.	Velocity per hour.
		Miles.			*Miles.*
1874	8	22.9	1883	7	29.9
1875	7	23.6	1884	7	21.9
1876	6	24.3	1885	8	27.6
1877	6	22.8	1886	9	21.3
1878	7	20.9	1887	7	22.6
1879	9	26.2	1888	7	23.3
1880	6	25.2	1889	11	23.3
1881	5	24.2	1890	9	22.1
1882	6	19.8			

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.								
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date
High areas.		°	°	°	°	*Days.*	*Miles.*		*Inch.*			°					
I	1	47	112	27	90	7.5	22	Dubuque, Iowa	.28	4	Buffalo, N. Y	16	4	Fort Assinniboine, Mont.	ne.	30	2
II	8	51	107	33	78	4.0	24	Rockliffe, Ont	.40	9	Rockliffe, Ont	22	9	Philadelphia, Pa	n.	14	11
III	13	47	122	43	81	3.5	29	Rapid City, S. Dak	.32	14	North Platte, Nebr	19	14	Qu'Appelle, N. W. T	nw.	12	14
IV	15	46	126	47	59	8.0	19	Huron, S. Dak	.32	17	Huron, S. Dak	14	17	Chicago, Ill	e.	16	19
V	21	47	125	40	103	3.5	16	Portland, Oregon	.18	21	Denver, Colo	15	22	Fort Canby, Wash	ne.	14	22
Mean						5.3	22		.30			17				17	
Low areas.									Fall.			Rise.					
I	1	48	83	49	67	4.0	11	Buffalo, N. Y	.14	1	Duluth, Minn	12	1	Toledo, Ohio	nw.	26	1
II	3	51	115	44	96	3.0	13	Fort Sully, S. Dak	.34	4	Rapid City, S. Dak	16	4	Sioux City, Iowa	s.	42	5
III	6	52	110	50	62	3.0	29	Chatham, N. B	.40	8	do	18	6	Moorhead, Minn	nw.	76	7
IV	8	43	116	38	101	2.5	20	Fort Custer, Mont	.16	11	Fort Sully, S. Dak	18	9	Valentine, Nebr	s.	48	10
V	12	45	101	41	90	2.0	14	Huron, S. Dak	.24	12	Rapid City, S. Dak	18	12	Chicago, Ill	ne.	48	14
VI	15	50	108	42	69	2.0	42	Nantucket, Mass	.32	17	Cheyenne, Wyo	17	15	Rawlins, Wyo	nw.	48	15
VII	18	53	113	31	92	6.0	17	Qu'Appelle, N. W. T	.28	18	Pueblo, Colo	12	23	Fort Assinniboine, Mont.	s.	42	18
VIII	23	48	87	50	67	3.5	18	Eastport, Me	.24	25	Eastport, Me	10	26	Block Island, R. I	sw.	36	26
IX	28	36	107	48	76	2.5	35	Fort Buford, N. Dak	.30	29	Oswego, N. Y	14	31	Rawlins, Wyo	nw.	48	30
Mean						3.2	22		.27			15				42	

NORTH ATLANTIC STORMS FOR JULY, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the storms that appeared over the north Atlantic Ocean during July, 1890, are shown on chart i. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight storms have been traced for July, 1890, the average number for the corresponding month of the last seven years being 7. Of the storms traced for the current month 5 were continuations of depressions which first appeared over the North American continent; 1 apparently originated north of the Bermudas; and 2 were first located east of the 20th meridian. The storms pursued normal east to northeast paths, and no storm traversed the ocean from coast to coast. Generally fine weather prevailed over the north Atlantic during the month, the more important disturbances occurring south of Newfoundland on the 5th, when fresh to strong gales were reported; over mid-ocean in high latitudes on the 30th and 31st, when pressure ranging from 29.20 (742) to 29.40 (747) and fresh to strong gales were noted; and to the west of the British Isles on the 7th and 27th, when the pressure fell below 29.50 (749), and moderate to fresh gales were encountered. In July of preceding years storms of marked strength have seldom been encountered in the middle latitudes of the north Atlantic Ocean, the most destructive storms of the month generally appearing in the sub-tropical or tropical regions. Among notable West Indian cyclones for July described in the REVIEW during the last seven years were those of 1886 and 1887. The hurricane of 1887 advanced from Barbadoes Island westward over the Caribbean Sea and thence northward over the Gulf of Mexico to the east Gulf states from the 20th to the close of the month. This storm was very severe at Barbadoes Island on the 20th, and several vessels were wrecked. Several vessels were wrecked on the north Cuban coast and on the west coast of Florida, and very heavy rainfall in the Gulf States, in connection with high winds and swollen rivers, caused great destruction to growing crops and public highways. In 1886 two storms advanced from the vicinity of Cuba, neither of which was very destructive.

July, 1890, opened with low pressure over the British Isles, and there was evidence of a disturbance north or northeast of the Bermudas. On the 2d a storm of slight energy was central south of Newfoundland, whence it apparently moved northward and united with another in the Saint Lawrence Valley. Over the eastern part of the ocean unsettled weather continued until the 5th. From the 5th to 7th fresh gales attended the passage of a storm from the lower Saint Lawrence valley to northeast of Newfoundland, and during the 7th and 8th unsettled weather prevailed over mid-ocean with the advance of this storm to the northward. On the 7th a storm was central west of Ireland, having advanced from the westward, with pressure below 29.50 (749) and fresh gales, and under the influence of this storm unsettled weather continued over and near the British Isles until the 10th. On the 9th a storm was central over the Gulf of Saint Lawrence, having advanced from the westward, with pressure below 29.40 (747); by the 10th this storm had moved northeastward beyond the region of observation. On the 13th and 14th low pressure prevailed over the British Isles, probably attending the passage of a storm to

the northward, and on the 13th the barometer fell to 29.47 (748) at Leith, Scotland. During the 15th a storm passed northeastward from the lower Saint Lawrence valley, and on the 16th was apparently central off the Labrador coast. The weather continued unsettled over and near Newfoundland during the 17th, and by the 18th there was a marked decrease in pressure, unsettled weather, and fresh gales over the Canadian Maritime Provinces. On the evening of the 19th a storm of slight energy was central on the New England coast, whence it moved to the southeast of Nova Scotia by the 20th, attended by fresh gales, after which it apparently dissipated. On the 18th unsettled weather prevailed over and near the British Isles. On the 26th and 27th a storm was central northwest of the British Isles, and on the latter-named date pressure falling to or below 29.40 (747) was reported in that region. By the 28th this storm had advanced to north of the British Isles. On the 27th a storm was central north of the Gulf of Saint Lawrence, having advanced from the Saint Lawrence Valley. Moving east-northeast the storm reached the 30th meridian by the 29th, attended by fresh to strong gales and pressure falling to about 29.40 (747), and during the 30th and 31st it apparently remained central south or southwest of Iceland, with decreasing pressure, and fresh gales in the trans-Atlantic steamship routes. On the 31st a storm central in the lower Saint Lawrence valley was attended by fresh gales south of Nova Scotia.

OCEAN ICE IN JULY.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for July, during the last eight years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
July, 1883	42 42	49 57	July, 1883	46 47	45 44
July, 1884	46 24	50 02	July, 1884	48 36	46 28
July, 1885	42 14	48 30	July, 1885	48 00	44 00
July, 1886	42 59	49 18	July, 1886†	45 52	34 39
July, 1887	43 30	50 05	July, 1887	52 04	41 16
July, 1888*	.....	.....	July, 1888	47 40	50 10
July, 1889	44 49	47 45	July, 1889	45 50	40 00
July, 1890	41 25	47 30	July, 1890‡	50 08	38 45

*Off Cape Race. †An iceberg and field ice. ‡On the 10th a small piece of ice was reported in N. 48° 33′, W. 24° 11′.

The above table shows that for July, 1890, ice was reported about 2½° farther south, and over 4° farther east than the average southern and eastern limits of Arctic ice for the month, as determined from reports of the last seven years. The southernmost ice reported for the current month, a large iceberg on the 15th in the position given, was nearly 1° farther south than the southernmost ice previously reported for July, no ice having been noted south of the 42d parallel for the corresponding month of preceding years, and the easternmost ice reported, a small iceberg on the 6th in the position given, was about 4° west of the extreme eastern limit of ice for July, and was the only ice reported east of the 40th meridian, save in 1886, when an iceberg was noted in W. 34° 30′. Comparing the current with the preceding month, there was a marked decrease in the aggregate quantity of ice reported over and near the Banks of Newfoundland, and an increase along the east coast of Newfoundland. Numerous icebergs and heavy field ice were reported in, and east of, the Straits of Belle Isle, along the Labrador coast, and in the Gulf of Saint Lawrence east of the 60th meridian. Compared with the corresponding month of preceding years the ice reported for July, 1890, about equalled the average in quantity. The limits of the region within which Arctic ice was reported for July, 1890, are shown on chart i by ruled shading.

FOG IN JULY.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on 26 dates; between the 55th and 65th meridians on 14 dates; and west of the 65th meridian on 10 dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks numbered 3 more than the average; between the 55th and 65th meridians 2 less than the average; and west of the 65th meridian 2 more than the average. The 15th, 21st, and 29th to 31st were the only dates on which fog was not reported over or near the Grand Banks. On all dates on which fog was reported near the Banks of Newfoundland there were storms approaching from the west, save on the 13th when it occurred with unsettled weather, rain, and high pressure, and from the 22d to 25th when it was noted while high pressure prevailed over that region. Between the 55th and 65th meridians fog was reported with the approach or passage to the northward of general storms, save on the 12th, 13th, and 30th when it occurred while relatively high pressure, unsettled weather, and rain prevailed in that region. West of the 65th meridian fog was reported with the approach or passage to the northward of general storms, save on the 28th and 30th, when it occurred while high pressure and unsettled weather prevailed in that region. On the 1st to 5th, 14th, 15th, 17th, 24th, 25th, and 29th dense fog was reported at points along the New England or New York coasts by observers of the Signal Service, its occurrence in each instance attending the presence in the Saint Lawrence Valley or the Lake region of general storms whose influence extended off the coast.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for July, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature was highest in the valley of the Colorado River from extreme south Nevada southward, and in the adjoining part of Cal., and in the middle and lower Gila valleys, where it was above 95. The mean values were above 85 in southeast Cal. south of the San Joaquin Valley, in southern Nev., west and southwest Ariz., in the lower Rio Grande valley, from central Tex. northward to south-central Kansas, and from northwest Kans. over extreme southwest Nebr. and a part of northeast Colo. The mean temperature was lowest in west-central Colo., where it was below 55; at Tatoosh Island, Wash., the mean temperature was 49.8. The mean values were below 60 in the lower Saint Lawrence valley, and along the immediate Pacific coast from San Francisco, Cal., northward, and were below 65 north of a line traced from the coast of eastern Me. irregularly westward to northeast Minn., in the British Possessions north of N. Dak., western Mont., and Wash., and along the immediate Pacific coast north of the 35th parallel.

The mean temperature was generally above the normal from the Mississippi River and the upper lake region westward to the western part of the middle and northern plateau regions,